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ABSTRACT

This publication, the fourth in a series of seven for elementary schools, is an environmental education curriculum guide with a focus on waste management issues. It contains a unit of exercises selected for third grade students focusing on waste management. Litter is cited as one problem that very young children can comprehend and solve. They can learn to dispose of waste properly, help recycle some items, and come to understand how their own behavior affects the environment. The activities included in this unit use waste management to facilitate an environmental awareness and sense of environmental responsibility. Unit activities are designed to allow students to trace historical changes in consumption and packaging and study the meaning of the term biodegradable. The unit presents the following major ideas: (1) manufactured products and packaging have changed through time; (2) the United States has problems with both littered and non-littered solid wastes; (3) the increased numbers of people and products create a huge amount of waste; (4) modern packaging has many advantages; (5) some modern packages are necessary while others are not; (6) modern materials often last a long time when littered in the environment; (7) it takes thought and imagination to invent useful packages; and (8) people are responsible for solid waste and litter. Each activity in the unit meets the Virginia Department of Education Standards of Learning Objectives for Science, however, the material is designed to be interdisciplinary and may also be used to meet social studies, health, language arts, mathematics, or art requirements. A list of additional resources (articles, magazines, educational curricula) is included. (MCO)

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OPERATION WASTE WATCH:

THE NEW THREE RS FOR ELEMENTARY SCHOOL

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GRADE THREE

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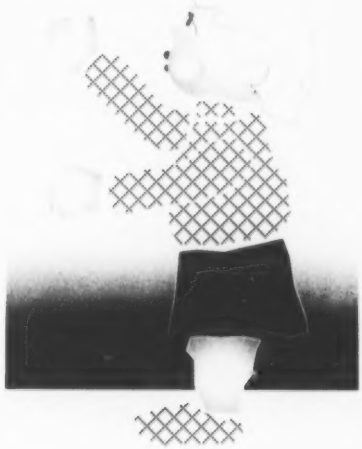
OPERATION WASTE WATCH:
THE NEW THREE RS FOR ELEMENTARY SCHOOL
GRADE THREE

Foreword

Ten years ago, the Division of Litter Control developed a curriculum for elementary schools called **Operation Waste Watch,** an environmental education curriculum with a focus on waste management issues. The seven grade level, multimedia units have been widely used in classrooms across the state and are considered a national model for environmental education. Each unit came with a number of peripheral teaching aids, including film strips, classroom posters, and coloring or comic books, which emphasized the theme of the unit and were designed to be taken home by the students, thereby extending and strengthening the original messages of litter control and recycling.

The instructional core of the unit was in the activity cards which presented several lessons for class or individual participation. Each teacher could select among the activities, incorporating only that material which he or she wished to use. **Operation Waste Watch** materials were designed to be interdisciplinary and may be used to meet science, social studies, health, language arts, mathematic, or art requirements. Activities in the Third Grade level of Operation Waste Watch correlate with several of the science objectives, as well as more generally with social studies, language arts, health, and art objectives.

This new edition of our curriculum comes in a markedly different package: a Teacher's Workbook, rather than the slip case filled with materials. Our annual surveys showed that the film strips while desired, were rarely used. The cards were hard to keep track of. The original format was never designed for refills, continual orders, or maintenance over a period of time. Many unit components got lost or strayed. As teachers moved to other schools, **OWW** moved in bits or pieces. After some ten years, it was time to update the bibliography and modify some of the activities to take into account the current state of the world of solid waste. All these conditions translate into a simpler format which will be easier to order and use. We hope you will enjoy this second edition of **Operation Waste Watch: The New Three Rs For Elementary School.**



THE NEW THREE RS FOR ELEMENTARY SCHOOL

The theme of the third grade unit is **Trash Trends**. Students will trace the historical changes in consumption and packaging. They will also study the roles of packaging in everyday life and learn the meaning of the term biodegradable.

Major ideas of the unit include:

- Manufactured products and packaging have changed through time.
- Our country has problems with both littered and non-littered solid wastes.
- The increased numbers of people and products create a huge amount of waste.
- Modern packaging has many advantages.
- Some modern packages are necessary while others are not.
- Modern materials often last a long time when littered in the environment.
- It takes thought and imagination to invent useful packages.
- People are responsible for solid waste and litter. They can learn to reuse and recycle waste and other materials and dispose of their trash properly.

At the completion of the unit, the student will be able to define the term solid waste. They will understand what is meant by the term litter. They will be able to define the term biodegradable and identify objects that are biodegradable. Students will be able to distinguish between packaging materials used in present-day America and those used in earlier times and by other cultures. Students will invent new uses for used packaging materials.

Litter is a very accessible pollution and one even young children can comprehend. Children may be able to do very little to solve other environmental problems, but they can learn to dispose of waste properly, help recycle household and classroom items, and come to understand how their own behavior affects the environment. A waste management unit is an excellent place to begin creating environmental awareness. From this step, young people can develop a strong sense of environmental responsibility.

While grade three Operation Waste Watch focuses in particular on packaging trends and source reduction, many of the activities stress the importance of recording and observing, which, along with making inferences, are stressed in the third grade. Many of the activities in the third grade unit of **Operation Waste Watch** correlate with the science objectives for the Standards of Learning in grade 3. The program will meet the following Standards of Learning Objectives for Science as presented by the Virginia Department of Education:

3.4

The student will record and describe information gathered from first hand experience.

3.5

The student will infer the possible cause and effect of an event.

3.7
The student will place natural events in order and use the sequence to tell what comes next.

3.12
The student will identify the major components of soil and describe the importance of soil on earth.

Several objectives of different content areas correlate with the activities in ***Operation Waste Watch***

Social Studies
3.3
The student will actively participate in the decision making process by identifying problems and suggesting possible solutions.

3.5
The student will identify environmental features in the local community.

3.9
The student will recognize interdependence of people and groups.

Health
3.1
The student will identify sources of air pollution.

3.2
The student will identify sources of water pollution and their effects on health.

3.16
The student will identify dangers in the immediate environment.

Language Arts
3.9
The student will write a paragraph containing a stated main idea sentence.

3.10
The student will share personal experiences and feelings in writing.

3.15
The student will draw reasonable conclusions from the information provided.

Classroom sets of comic books entitled **A World without Litter** may be ordered from the Department of Waste Management by classroom teachers. Please allow three weeks for delivery. Contact:

Materials Technician
Department of Waste Management
Eleventh Floor, James Monroe Building
Richmond, VA 23219

804/786-8679

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TRASH TRENDS

"New" Paper Demonstration

(SOL Science 3.5, 3.7, Health 3.2, 3.16; Social Studies 3.3; Language Arts 3.15)

One of the most revealing activities in promoting recycling is actually to participate in the manufacture of new goods from old. The process of making paper has been substantially unchanged for 2000 years and from the beginning has used old paper. Many versions of papermaking exist; the following is a good demonstration of papermaking. One word of caution: papermaking is messy.

Materials you will need:

water
sink area or large dish pans
food blender
sheets of newspapers
large food strainer with metal mesh
rolling pin
iron and surface, such as a cutting board, on which to iron
several press cloths (10 x 15") and a terry cloth towel
2 pieces of metal screening

Procedure:

Fill the blender 3/4 full with warm water and add small strips of newspaper gradually until the liquid is cloudy but not thick. You will need about one full-size sheet of newspaper.

Pour the pulp slowly and evenly over the entire surface of the strainer, excess water draining into the sink.

Put folded terry cloth towel on the demonstration table. Put one screen on the towel. Remove the new paper from the strainer, place it on the screen and put the other screen over it.

Roll out excess moisture with the rolling pin. While it is still wet, take the piece of new paper and place it between press cloths. Set the iron to a warm heat and press the paper. Keep the iron moving to prevent sticking.

Have the students compare the new paper to its source, the newsprint. What conclusions can the class come to about amount of paper used in recycling? Does the paper you made look and feel like its source? What are some uses for old newpapers? Are any of the students' families recycling old newspapers? Does paper decompose quickly?

Further Activities:

For some people, paper-making is a art form. **Paper By Kids** by Arnold C. Grummer, published by Dillon Press, has a number of variations on paper making as outlined above, especially including colored threads, wild flowers or leaves, cut-outs, and design forms.

Also, by making up additional pulp ahead of time and having the students work in groups, the lesson can change from a demonstration to a laboratory.

Useful Packaging

(SOL Objectives Science 3.4, 3.5; Health 3.16; Social Studies 3.9)

Today food is usually packaged in a wide variety of ways before it is sold. The containers help the food last longer, protect it from insects or bacteria, and make it easier or more convenient to carry.

Ask the students to name some packaging that is useful. What are some packages that are protective?

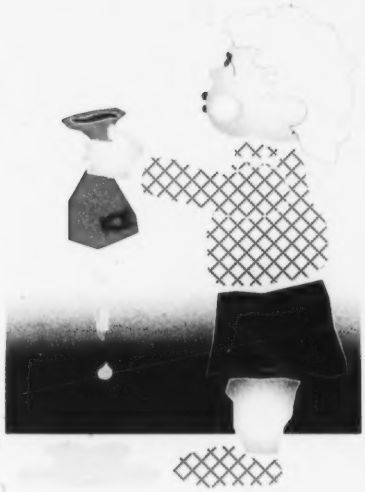
At home tonight, have the students look in their kitchen cupboards and identify as many different kinds of packages as they can. Have them list the different kinds of packages. They should also answer the following questions:

1. How many of the packages are biodegradable?

2. How many of the packages are necessary? Which are not necessary?

3. Which packaging materials are reusable?

Another function of packaging is marketing; the package itself attracts the buyer's attention and creates the desire to buy. To show how this can work, package identical treats, half in brown paper and half in gift wrapping. Put all the treats in a box together. Without telling the students what to look for, have them each take a treat. Then ask, which did they want more, the brown paper bagged treat or the gaily gift wrapped one? Do they have other examples of being attracted to something (cereal, snack foods, candy) in a fancy package?



Package an Ice Cube?

(SOL Objectives Science 3.4, 3.5, 3.7; Health 3.16; Language Arts 3.15)

This is a test of imagination and engineering. Provide newspaper, plastic wrap, aluminum foil, bubble wrap, or any other packaging materials you may have. Have one ice cube for each student.

Their task is to wrap their ice cube and keep it from melting.

Each student should measure his/her ice cube before it is put in its package. Ice cube should be measured length, width, and height and the measurements should be recorded.

TRASH TRENDS

List all the materials used in the packaging.

After one hour, students should unwrap their packages. Do they still have an ice cube? If the ice cube is still there, the student should measure it for loss. Record the new measurements.

The ice cube that melted the least is the best packaged. How much material was used in the best package?

Additional Activities

A variation of this activity involves raw eggs and protective wrapping. Here again, the students will solve a problem of protecting a fragile object from a hostile environment. Students should make a list of the materials they use in creating their package. The experts will be those whose packaging is efficient as well as entirely protective. Some teachers hard cook the eggs before using them so that breakage is not so messy.

Trashmasters

(SOL Objectives Social Studies 3.5, 3.9; Health 3.1, 3.16)

Members of the class should wear gloves for this activity.

Divide the class into several teams and give each team a large plastic trash bag. The children should go outside and all work in the same general area, collecting as much manufactured (not natural) litter as they can in ten minutes. No trash baskets or other containers should be emptied. (That material has been disposed of properly and is not litter.) The litter must be put in the team bag. Winning group collects the most litter.

When the teams return to the classroom, have them empty their bags onto newpaper sheets spread on the floor. They should separate their trash by categories: **glass metal plastics paper**

Which of the piles for each team is the largest? How much of the trash is packaging materials? How many times was each package used before being littered? Which items can be recycled in your community? Have the recyclable items separated out from the trash. What has happened to the pile of trash? What will be done with the non-recyclables now? Why is it important to have less material going into the landfills?

The Mini-Landfill

(SOL Objectives Science 3.5, 3.7, 3.12; Health 3.1,3.2; Social Studies 3.3, 3.5)

Actually, this facility would not be approved under the guidelines and regulations now in use, but the findings of the class as this activity proceeds are very worth while. This is a longitudinal study; it takes very little time to set up but several weeks to disclose any changes.

Materials:

shoe box
small paper bag
sheet of plastic
soil
plastic bag
cup of water

Procedure:

Line the shoe box with the plastic sheet so that the water will not soak through. Fill the box about 2/3 of the way with regular soil from the schoolyard or your back yard. Cut both the paper and plastic bags into pieces about one inch square. Bury the paper pieces on one side of the box and the plastic pieces on the other side of the box. Keep the soil moist but not drenched. Keep a record of the condition of plastic and paper pieces after 1, 3, 5, 7, 10, 20, and 30 days. Discuss what happens., Ask individual students what **biodegradable** means. Emphasize that paper is one man-made substance which is biodegradable.

The children should understand that the landfill where their trash goes is different. The daily compacting and clay covering will keep water away from the buried trash in a real landfill, thus preventing in the real landfill the activity the class is monitoring in the model. The May 1991 issue of the **National Geographic** has an excellent article including graphics showing landfill activity.

Additional Activities:

The class can consider several items and classify them as to: that which should be disposed of in a landfill, that which should be recycled, that which should not be disposed of in a landfill and not sure. Help the students give reasons for the categories they choose. What characteristics do the landfill items have in common? Items to use in this exercise:

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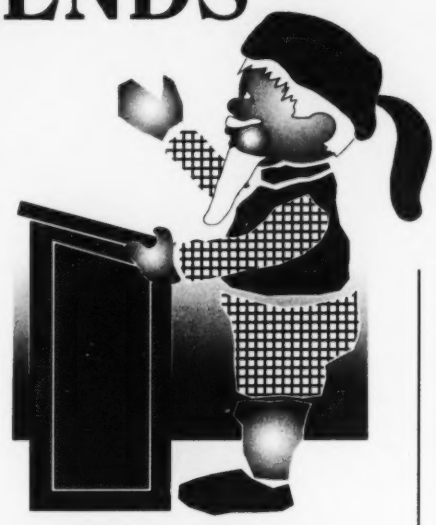
TRASH TRENDS

aluminum cans
newspapers
automobile tires
food scraps
glass bottles
plastic bags
grass clippings
old rags
pine cones
cereal boxes
insect spray can
"tin" cans
paint in its can
cardboard boxes
plastic milk jug

Will the items selected to be landfilled act like the paper or the plastic in the Landfill exercise? What are some things to consider about landfilled items? (They do not degrade as quickly as we think, or they do not degrade at all. Biodegradable items are those which break down naturally to basic elements by biological processes.) How many of the items can be recycled in your community? What things are considered hazardous wastes? Why should they not be disposed of by landfilling? Have someone in the class find out how to take care of hazardous waste in your community.



Oral History Lessons: Packaging

(SOL Objectives Science 3.4, 3.5; Language Arts 3.10, 3.15; Social Studies 3.5, 3.9; Health 3.16)

Have each student in the class talk to someone who is over 50 years old. The student should ask this person what kinds of packages were used in the United States when he or she was in the third grade. Children who can, should ask this question of someone who was living in another country at that time. What kinds of packages did they use? Children should ask why packaging has changed.

Students should bring in their answers and the class can compile a list of packaging items which were used 50 years ago. What materials are different? What are the same?

How does modern packaging help people? Will packaging be different in 25 years? What conclusions can the class reach?

Additional Activities

Bring books to class showing pictures of life in other lands. Show the children pictures of the kinds of packages used in such places as Brazil, India, China, France, Germany, Japan, Saudi Arabia, and the United Kingdom. Ask the students: Which of these countries probably have the greatest problems with their solid waste? Which countries used the most non-biodegradable packaging? How about biodegradable packaging?

Follow up on the fifty years ago oral history with this exercise about a hundred years ago.

If you were eight years old one hundred years ago, you very likely lived on a farm. You may have helped your family grow a lot of your own food and helped to make your own clothes. Your family would not have had electricity.

What might you have eaten for dinner? Where would you get the food? How would it have been packaged? Was there much of a problem with litter a hundred years ago? Did people have a problem getting rid of their trash? Why or why not?

Have the children find confirmation of their answers in their social studies books or in books from the library.

What kinds of packaging did the first settlers of the North American continent use? Did the people living here 300 years ago buy many ready-to-use products? Was used packaging much of a problem? Did anyone recycle in that time?

These days a lot of people are talking about our solid waste management problem. What are some families doing to make the total amount of trash they create become smaller? What are some examples of less packaging? What do they take groceries home in? (One of life's new dilemmas is making the decision at the check out counter between paper and plastic bags. How many families carry canvas or string bags?

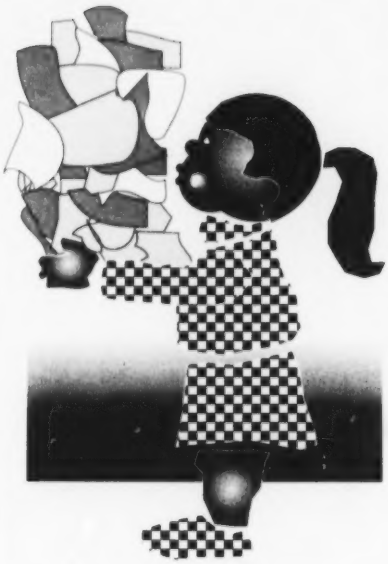
Carrying It All Around

(SOL Objectives Social Studies 3.3, Language Arts 3.10, 3.15; Health 3.16)

Keeping things together, clean and safe, is one of the reasons for many of the bags and boxes we use in our everyday life. This form of packaging is the most useful and, while it is often disposable, does not need to be discarded after one use.

Ask the students to look at the lunches which they carry to school. Most third graders probably use lunch boxes. Why? What is the alternative? Why is a paper lunch bag not as good a choice as a lunch box? What containers are the sandwiches in? What can be used instead of plastic bags which are thrown away after one use? How might the lunch drink be carried? Is there a substitude for the napkin? What drawbacks might students find to reusing containers day after day? What would happen to the lunchtime trash if everyone carried reusable containers?

After a year, what do the students do with their old lunch boxes? Why? What might be done with an old lunch box? Have the class come up with a variety of



viable uses, such as crayon and marker or arts and crafts supplies holder, first aid kit, toy carrier. What changes would they make in the lunch box to extend its useful life?

When we buy items in a store, they are usually bagged. What are some reasons for this? What happens to the bag when we get home? What might we do with a store bag? How can we keep the usefulness of a store bag without getting so much trash? Do any families carry tote bags when they go shopping? Some grocery stores are selling canvas bags. Are there any other types of carriers being used by families in the class? Have the class make some posters suggesting other ways to carry purchases instead of the store's paper or plastic bags.

ADDITIONAL RESOURCES

Articles:

Rathje, William; "Once and Future Landfills;" *National Geographic,* May 1991; published by the National Geographic Society, Washington, DC.

Rathje, William; "The Garbage Crisis;" *Atlantic Monthly*; December 1989.

"Reading, Writing, and Recycling, A Catalog of Education Materials;" *resource RECYCLING,* December 1990, published by Resource Recycling, Portland OR 97209.

"Recycling Makes the Grade in Schools," *Reusable News,* Spring, 1990; United States Environmental Protection Agency; RCRA Information Center, 401 M Street S. W., Washington DC 20460.

"The Trashing of Virginia;" series of articles printed in the Richmond ***Times Dispatch;*** August 26-29, 1990; Richmond Newspapers, Inc.; Richmond VA 23261.

Magazines:

Garbage: The Practical Journal for the Environment; published bi-monthly by Old House Journal Corp.; 435 Ninth Street, Brooklyn NY 11215.

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resource RECYCLING: North American's Recycling Journal; published monthly by Resource Recycling, Inc.; 1206 N.W. 21st Avenue, Portland OR 97209.

Waste Age; published monthly by the National Solid Waste Management Association; Suite 1000, 1730 Rhode Island Avenue, N.W., Washington DC 20036.

Educational Curricula:

A Curriculum Activities Guide to Solid Waste and Environmental Studies (K-12); Institute for Environmental Education; 3200 Chagrin Boulevard, Cleveland OH 44124.

Garbage In America; Refuse Industry Productions, Inc.; P. O. Box 1011, Grass Valley CA 95945.

Garbage Reincarnation: Curriculum Guide (4-6); Garbage Reincarnation, Inc.; Post Office Box 1375, Santa Rosa CA 95402.

Let's Recycle (K-6, 7-12); The United States Environmental Protection Agency; Public Information Center, 401 M Street, S.W., Washington DC 20460.

Mobius Curriculum: Understanding the Waste Cycle (4-6); Browning Ferris Industries, Inc.; 8607 Roberts Drive, Suite 100, Atlanta GA 30350.

New Three Rs: Reduce, Reuse, and Recycle (6-12); Virginia Department of Waste Management; Eleventh Floor, James Monroe Building, Richmond VA 23219.

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People and Their Environment (1-3, 4-6); A conservation project of the National Council of State Garden Clubs, ©Brentree Environmental Center; Brentree Farms, Inc., Milford PA; published by Bayberry Press; Port Washington NY.

Project WILD (K-6); contact Virginia State Coordinator Suzie Gilley, Wildlife Education Specialist; Department of Game and Inland Fisheries; P. O. Box 11104, Richmond VA 23230-1104.

Save It! Easy Environmental Tips to Save the Earth; developed by Corporation for Public Broadcasting; published by Custom Print, Inc.; 2611 Shirlington Road, Arlington VA 22206.

Think Earth Environmental Education Program (K-3, 4-6 available 1992); Educational Development Specialists; Think Earth Customer Service, 5505 East Carson Street, Suite 200, Lakewood CA 90713.

Waste: A Hidden Resource (7-12); Keep America Beautiful, Inc.; 9 West Broad Street, Stamford CT 06902.

Waste In Place (K-7): Keep America Beautiful, Inc.; 9 West Broad Street, Stamford CT 06902.

Other Information:

The Fourth R: An Implementation Guide for School Recycling and Solid Waste Management; produced by Association of Vermont Recyclers; P. O. Box 1244, Montpelier VT 05601.

How to Set up a School Recycling Program; produced by the Council for Solid Waste Solutions; 1275 K Street N. W., Suite 400, Washington DC 20005.

Setting Up a Solid Waste Recycling Program in Schools; ©J. Winston Porter; produced by McDonald's Corporation; One McDonald's Plaza, Oak Brook IL 60521.

NOTES:

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